AutoMate Scientific®

READY FOR RESEARCH™

2012-2013
CATALOG

PERFUSION SYSTEMS

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AMPLIFIERS & STIMULATORS 18 +5

DATA ACQUISITION

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MANIPULATORS & PULLERS

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Perfusion System

13-01-53 ValveBank8 Teflon Perfusion System

Valve Controllers

ValveLink Controller

ValveBank Controller

Reservoirs

You can choose 15, 35, 60 or 140ml reservoirs

How to configure and order a perfusion system.

AutoMate Scientific sells complete perfusion systems as well as individual components. This can make it confusing for customers to determine which pieces they need to order. We hope this guide helps. All of the items mentioned below are explained in more detail on the following pages, or you can quickly customize a complete perfusion system on our web site at http://www.autom8.com/build_your_own.html.

1. Gravity, bath perfusion systems
2. Pressurized, fast, local drug application
3. Temperature control
4. Putting it all together

1. Gravity, bath perfusion systems

Our Perfusion Systems are complete gravity, bath perfusion systems. You can choose the number of channels (liquids), one of two valve controllers (ValveBank® or ValveLink®), and one of three different kinds of valves (pinch, PTFE-inert, and Lee valves). Everything you need for a regular gravity perfusion system is included: controller, valves, reservoirs, ringstand, 1/16" i.d tubing and 4-, 8-, or 16-into-1 micro-manifold with flow regulator. Gravity PTFE-inert systems include drippers and a reservoir bracket.

This Perfusion System is ideal for switching solutions flowing into a perfusion chamber for slice electrophysiology, oocytes, imaging, etc. with flow rates from near zero up to 6-10 ml/minute. We usually recommend pinch valves (cheapest and easiest to clean) unless you need faster switching. Our

Gravity Perfusion Systems Ordering Information

Part No.	Electrophysiology
17-pp-54	ValveLink8 Pinch Valve Perfusion System
2x #01-05	Low-noise grounding packages (4 valves each)
01-20	Full BNC cable or alternate cable for Heka amplifiers

Part No.	Imaging or no digital outputs
13-pp-54	ValveBank8 Pinch Valve Perfusion System
	You can choose 15, 35, 60 or 140ml reservoirs.

ValveLink controller is designed for customers who have digital/TTL outputs from their computer -- from data acquisition software like pCLAMP, Pulse, Patchmaster, WinWCP, MetaMorph, etc. or I/O hardware with software like LabView or MATLAB. Alternatively, our ValveBank controller is completely programmable without needing a computer. It is ideal for setups without computer control or imaging software with only 1-2 digital trigger or shutter outputs.

2. Pressurized, fast, local drug application

For customers needing faster switching times (ligand-gated channels, etc.) we recommend local drug application -- often called "spritzing" or "superfusion." This means the perfusion tubes meet in a smaller manifold with a tiny tip ideal for squirting solution directly at a patch or region of interest. AutoMate Scientific's Perfusion Pencil® can achieve switching times below 10 milliseconds WITHOUT the need of "steppers" or piezo switchers. This manifold combines 4, 8 or 16 tubes into a single, removable tip with a micro dead volume of 2-3 µl. When the perfusion system's valves upstream switch from one liquid to the next, the change happens inside the Perfusion Pencil tip, resulting in very fast switching times.

For researchers who need faster switching times, steadier flow rates, fine microliter delivery or small pipette tips, we recommend adding a Pressure Upgrade to the perfusion system. These pressurized syringe reservoirs with regulator push liquids out much faster than gravity, especially with small Perfusion Pencil tips. Air pressure is much more quiet (electrically and audibly), more smooth and more reliable than peristaltic pumps.

Electrophysiologists often need their solutions bubbled with Carbogen for slice oxygenation. For many years, AutoMate Scientific's Pressure Upgrade Kit was incompatible with bubbling because the syringe reservoirs are closed air-tight. However, we have created the new Oxygen8™ Bubbled Pressure Upgrade which simultaneously bubbles and pressurizes all of the solutions.

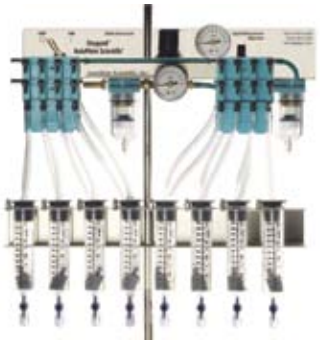
Perfusion Pencil

04-08-250 Perfusion Pencil

Perfusion Pressure Upgrade

09-08 Perfusion Pressure Upgrade

Oxygen8 Bubbled Pressure Upgrade



09-18 Oxygen8 Bubbled Pressure Upgrade

Pressurized Local Drug Application Ordering Information

Part No.	4 Channels
04-04-xxx	Perfusion Pencil with 100, 250 or 360µm tip
09-04	Perfusion Pressure Upgrade
09-14	Oxygen8 Bubbled Pressure Upgrade

Part No.	8 Channels
04-08-xxx	Perfusion Pencil with 100, 250 or 360µm tip
09-08	Perfusion Pressure Upgrade
09-18	Oxygen8 Bubbled Pressure Upgrade

ThermoClamp Heater

03-18-xxx ThermoClamp Inline Heater

BubbleStop

10-8-60-G BubbleStop Syringe Heater - Gravity

3. Temperature control

AutoMate Scientific's standard perfusion systems are all room-temperature by default, but we offer several temperature control options: 1) ThermoClamp™ inline heater, 2) BubbleStop™ syringe reservoir heater, 3) Bioptechs stage heaters and 4) objective heaters. Most of the thermal mass your cells experience originates from the liquids flowing over them. Therefore, the most effective temperature control is a good inline solution heater which is positioned as close to the prep as possible. Our ThermoClamp-1 maintains your solution and bath temperature to within 1.0°C (often within 0.1°C) using a thermocouple in your perfusion chamber and another in the heater. It shares a similar design to our Perfusion Pencils mentioned previously, allowing for rapid solution switching from a fine removable tip while also maintaining 37°C or any desired temperature between ambient and 50°C.

When used with cold solutions (i.e. stored in the refrigerator overnight), inline heaters can create bubbles inside their tubing. Many people mistakenly believe these bubbles come from air leaking into the tubing, but they actually form because warm liquids cannot hold as much gas as cold solutions. The solutions release gas when heated, and cause bubbles which can interrupt your perfusion flow. AutoMate Scientific has designed an economical syringe heater block called the BubbleStop which pre-heats the liquids so they off-gas before entering your tubing.

Temperature Control Ordering Information

Part No.	4 Channels
03-14-xxx	ThermoClamp Inline Heater
10-4-60-G	BubbleStop Syringe Heater - Gravity
10-4-60-P	BubbleStop Syringe Heater - Pressure

Part No.	8 Channels
03-18-xxx	ThermoClamp Inline Heater
10-8-60-G	BubbleStop Syringe Heater - Gravity
10-8-60-P	BubbleStop Syringe Heater - Pressure

4. Putting it all together

To order a pressurized or temperature-controlled perfusion system, you should start with one of our unheated gravity systems, and add the additional pieces you need. Here are some examples:

Example Simple Systems Ordering Information

Part No.	4-Channel Pressurized Perfusion System
17-01-23	ValveLink8 PTFE-inert Perfusion System
09-04	Perfusion Pressure Upgrade
04-04-100	Perfusion Pencil with 100µm tip
01-29	USB cable

Part No.	8-Channel Heated Perfusion System
13-11-57	ValveBank8 Lee Valve Perfusion System
03-18-360	ThermoClamp Inline Heater with 360µm tip
10-8-60-G	BubbleStop Syringe Heater - Gravity
VB-1600	Heka EPC-10 ValveBank Interface Cable

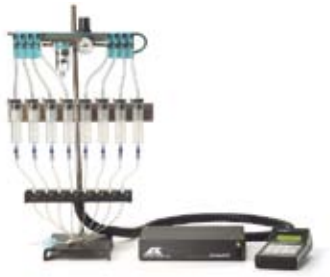
Example Advanced Systems Ordering Information

Part No.	8-Channel Heated Imaging System
13-01-53	ValveBank8 PTFE-inert Perfusion System
01-03-2000	EasyCode ValveBank Programming Software
09-T18	Oxygen8 Bubbled Pressure Kit - Top Half
10-8-60-G	BubbleStop Syringe Heater - Bottom
03-18-250	ThermoClamp Inline Heater with 250µm tip
01-15	ValveBank Parallel Port Cable to MetaMorph
Bi-0420-4	Delta T Open Dish Heated Stage System
vac	Vacuum Pump
canister	Vacuum Trap

Part No.	8-Channel Slice Electrophys System
17-11-57	ValveLink8 Lee Valve Perfusion System
01-05 x 2	Low-noise Grounding Packages
01-20	Full BNC cable to DigiData
09-T18	Oxygen8 Bubbled Pressure Kit - Top Half
10-8-60-G	BubbleStop Syringe Heater - Bottom
03-18-250	ThermoClamp Inline Heater with 250µm tip
S-BSC1	Brain Slice Chamber-1: Interface and Submerged
S-PTC03	Chamber Temperature Controller
canister	Vacuum Trap

We offer a great web form to help build you own perfusion system. Just answer a few questions, enter your contact info, and click Submit for a customized quote at: http://www.autom8.com/build_your_own.html

Perfusion Packages



13-11-57 ValveBank8 Lee Valve Perfusion System
01-05 Low-noise grounding package
09-08 Perfusion Pressure Kit

Brain Slice Chambers

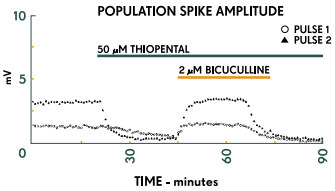
S-BSC1 Brain Slice Chamber-1: Interface and Submerged

Accessories

Custom BNC cables

"I am writing to tell you how pleased I am with the ValveBank8 Perfusion System. It's great that I can load the reservoirs, press go, and start recording. I can read papers rather than fussing with solutions and switching valves every 10-15 minutes. Since solutions are switched at exactly the same time from one experiment to the next, I have been able to automate my data analysis protocols as well."

Brain Slice Field Recording



Unattended solution delivery using a ValveBank8 AutoPrime Perfusion System

Dr. M. Bruce MacIver, M.Sc., Ph.D.
Department of Anesthesia
Stanford University Medical Center

Increase reproducibility with fewer hours in lab.

Gravity Perfusion Systems

- **Unattended solution switching**
  Avoid vibrations from switching valves by hand. The ValveBank®or ValveLink® controller handles all solution delivery so you can watch results – not switch stopcocks. Many special features are included for easy perfusion control. Low noise circuitry.

- **Increased reproducibility**
  Valve switching is accurate to 0.01 seconds with programs up to 99 hours long under microprocessor control. Consistent liquid delivery means better data.

- **Pinch, Teflon™ and Lee™ Valves**
  Choose between speed, cost, and ease of cleaning. Several options are available for fittings and reservoirs.

- **Manual and external valve control**
  Flexible design. Easy cleaning and calibration. Slave mode valve operation controlled by your computer, pClamp, Pulse, Acquire, LabView, AxoGraph, etc.

Valve Choices:

- **Pinch Valves for Reduced Maintenance**
  Easiest valves to clean and switch tubing. Liquids never touch the valves. Switches in 30-50 ms. 1/32" i.d. silicone tube passes through, and is pinched closed by solenoid activation. All AutoMate Scientific valves include an individual indicator LED. Our new aluminum enclosure keeps the valves dry from spills and offers luer lock ports for syringe reservoirs.

- **Teflon™ Valves for Fast Switching**
  Required for fast kinetics applications. Excellent chemical and corrosion resistance. Non-stick surface resists particles and chemical deposits. Switches in less than 10 ms, with 20 µl of dead volume from port to port. Threaded female inlet and outlet ports accept Hose Barb, Luer Lock and Nut & Ferrule fittings (see diagrams next page).

- **Lee™ Mini Valves for Extremely Fast Switching and Minimal Pressure Pulse**
  For the most demanding applications AutoMate Scientific offers tiny valves from the Lee Company. Enclosed in our new aluminum box with luer locks for syringe reservoirs, these valves can open and close in 1.5-4 ms with a ValveLink8.2 controller.

Pinch Valves

Teflon™ Valves

Lee™ Valves

Perfusion Systems Include:

Controller, valves, 60 ml syringe reservoirs, 2-way stopcocks, (reservoir bracket and drippers in Teflon systems only), ringstand, 1/16" i.d. tubing and four-, eight- or sixteen-into-one micro-manifold with built-in flow control. 5, 15, 35, 60 or 140 ml syringe reservoirs available.

The Economy Pinch Valve System includes a ValveLink8 controller, four pinch valves, 35 ml syringes, 2-way stopcocks, ringstand, 1/16" i.d. tubing and four-into-one micro-manifold with built-in flow control.

Computer Interfacing:

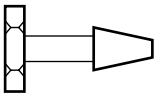
Perfusion systems can be controlled by a computer using data acquisition hardware (i.e., DigiData, ITC-16, or National Instruments board) and software (i.e., pCLAMP, Pulse, or LabView). Both ValveBanks and ValveLinks accept real-time TTL inputs to control valves. Most acquisition software already being used in your experiments can talk to our controllers. AutoMate Scientific offers an optional program called EasyCode® for the Macintosh and PC/Windows to program ValveBanks (not ValveLinks). This software is used before an experiment – valve sequences are downloaded into the memory of the ValveBank where they are run. An article by AutoMate Scientific can be found in Axon Instrument's AxoBits 17 newsletter outlining these strategies – accessible on our web site.

Luer-lock Fittings in Teflon Valves

Luer-lock fittings in Teflon™ valves allow direct connection of syringe reservoirs for minimal dead volume.

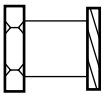
Teflon™ Valve Fitting Choices

Hose Barb



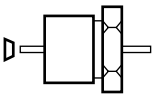
- Standard
- Available for 1/8" and 1/16" i.d. soft tubing

Lure-Lock



- For direct attachment of syringes
- Eliminates extra tubing between reservoirs and valves
- Includes 2-way stopcocks and 35 ml syringes

Nut & Ferrule



- HPLC-like, screw-in fittings for rigid, small-diameter (1/16" o.d.) tubing

CE

Perfusion Systems Ordering Information

Part No.	Product Description
17-21-20	**ValveLink®4.2 Economy Pinch Valve Perfusion System**
13-01-23	**ValveBank®4 Teflon Perfusion System**
13-pp-24	**ValveBank4 Pinch Valve Perfusion System** - 1/32" i.d. silicone tube
13-21-27	**ValveBank4 Lee Mini Valve Perfusion System**
17-01-23	**ValveLink4.2 Teflon Perfusion System**
17-pp-24	**ValveLink4.2 Pinch Valve Perfusion System** - 1/32" i.d. silicone tube
17-21-27	**ValveLink4.2 Lee Mini Valve 1.5 to 4 ms Perfusion System**
13-01-53	**ValveBank8 Teflon Perfusion System**
13-pp-54	**ValveBank8 Pinch Valve Perfusion System** - 1/32" i.d. silicone tube
13-21-57	**ValveBank8 Lee Mini Valve Perfusion System**
17-01-53	**ValveLink8.2 Teflon Perfusion System**
17-pp-54	**ValveLink8.2 Pinch Valve Perfusion System** - 1/32" i.d. silicone tube
17-21-57	**ValveLink8.2 Lee Mini Valve 1.5 to 4 ms Perfusion System**
17-01-83	**ValveLink16.2 Teflon Perfusion System**
17-pp-84	**ValveLink16.2 Pinch Valve Perfusion System** - 1/32" i.d. silicone tube
17-11-87	**ValveLink16.2 Lee Mini Valve 1.5 to 4 ms Perfusion System**

U.S./Canada prices shown. International prices add 15%. Email or visit web store for latest prices.

xx-[TB]-xx **Indicate [T]op inflow and [B]ottom outflow Teflon valve fittings:**
[0]=1/8" i.d. hose barb, [1]=1/16" i.d. hose barb, [2]=Luer-lock female with stopcocks and 35 ml syringes, [3]=10-32 threaded nut & ferrules for 1/16" o.d. tubing (add $30/set of 4), [p]=Pinch valves have no fittings

Systems include: Controller, user manual, valves, 35 ml or 60 ml syringes, stopcocks, (reservoir bracket and drippers in Teflon systems only), ringstand, 1/16" i.d. Tygon tubing, and 4-, 8- or 16-into-1 micro-manifold with flow control. 5, 15, 35, 60 or 140 ml syringe reservoirs available.

Visit www.autom8.com/build_your_own.html to configure a perfusion system and quote.

Valves & Fittings Ordering Information

Part No.	Product Description
	Each pair of 4 valves ordered together will be mounted in a case of 8.
02-01-02	**Set of 4 Teflon™ valves** - cabled and mounted
02-pp-04	**Set of 4 Pinch valves** - cabled and mounted, 1/32" i.d. silicone tube
02-21-07	**Set of 4 Lee mini valves** - cabled and mounted
02-01-02i	**Individual Teflon replacement valve**
02-pp-04i	**Individual Pinch replacement valve**
02-21-08i	**Individual Lee mini replacement valve**
01-05	**Low-noise, valve and case grounding package** (per 4 valves) A grounding wire attached to all valves extending back to the controller. This item is recommended for electrophysiology and required for CE conformity.
02-06	**Valve extension cables** - 3 meter RCA M/F (set of 4 cables)
05-01	**Luer-lock fittings** - with 2-way stopcocks (set of 4)
05-02	**Nut & ferrule fittings** - for 1/16" o.d. tubing (set of 4)

U.S./Canada prices shown. International prices add 15%. Email or visit web store for latest prices.

02-[TB]-02 **Indicate [T]op inflow and [B]ottom outflow Teflon valve fittings:**
[0]=1/8" i.d. hose barb, [1]=1/16" i.d. hose barb, [2]=Luer-lock female with stopcocks, [3]=10-32 threaded nut & ferrules for 1/16" o.d. tubing (add $30/set of 4), [p]=Pinch valves have no fittings

Ten times faster, new protection, inputs, and event marker in a smaller box.

"Our lab has been using ValveLink controllers for years with good, reliable results. The new ValveLink8.2 is even smaller and faster than its predecessor. It also looks cool and the buttons feel nicer than the previous version. I use it manually or programmed by outputs from my stimulator. I haven't observed any noise from the valve system on my electrophysiology rig."

Hillel Adesnik, Ph.D.
Department of Cellular and Molecular Pharmacology
University of California, San Francisco

ValveLink8.2® Controller

- **ValveGuard™ technology detects bad valves**
  Prevent damage to your ValveLink8.2® and easily observe problem valves.

- **Run experiments automatically – even unattended**
  By running experiments automatically, AutoMate Scientific systems will leave you free to accomplish other tasks – saving you both time and money.

- **Microprocessor-based for accuracy and flexibility**
  Our low-cost ValveLink8.2 controller has powerful perfusion commands and capabilities not offered by competing valve drivers: open single or multiple valves, master channel for control/buffer solution, computer control.

- **Low noise & low voltage valve control**
  Designed for electrophysiology. CE marked for Europe.

- **Manual, TTL (digital), analog, and USB inputs**
  Control valves manually (by pushbutton) or by computer – simultaneously thanks to the microprocessor design. Optional spill sensor protects your equipment when a leak is detected.

ValveLink8.2 Controller

- Manual pushbuttons
- Red/green LED indicators
- 1.5 amp, 12V AC supply included
- Dimensions: 9.28" x 1.6" x 5.13"
- Weight: 3 lbs. (1.4 kg.)

- Eight TTL inputs directly activate 8 valves
- Or control 16 valves with only four digital outputs

Additional Features

- One analog input can control eight valves
- Analog event marker allows you to record all valve activity
- An optional spill sensor stops all valves when a leak is detected to protect your microscope and table. All LEDs blink until you press a button to continue.

Free ValveLink PC Software

- Control valves directly from your PC screen by USB
- Network multiple ValveLinks into a single, virtual instrument

ValveLink8.2s can switch 12V DC solenoid valves open and closed in one millisecond using full power, then hold-in at 1/2 power to prevent thermal transfer to your solutions. Low noise circuitry minimizes recording artifacts in electrophysiology. The ValveLink8.2 is less expensive than AutoMate Scientific's ValveBank controller. It is the controller of choice for dose response work at pharmaceutical companies and the NIH. Both ValveLink8.2s and ValveBanks are designed for use with pClamp, Pulse, et al. All AutoMate Scientific products include a one-year warranty.

ValveGuard™ technology detects bad valves to prevent damage to your ValveLink8.2 and easily observe problem valves. Front-panel LEDs are dark for broken or disconnected valves, or blink for short-circuited valves. Automatic networking lets you connect up to eight ValveLink8.2s to a USB hub and PC to create a single 64-channel controller. A ValveLink8.2 can power individual valves up to 1 amp (12 watts), and a total of 2 amps for all valves open simultaneously.

ValveBank or ValveLink8.2: Which controller is right for you?

Features	ValveBank	ValveLink8.2
CHANNELS	4 or 8 channels available	8 channels each, USB network to 64 channels
COMPUTER I/O	8 digital in, 8 digital out, serial (RS-232)	8 digital in, USB, analog input, event marker out
DIGITAL INPUTS	One pulse can start a ValveBank program, or TTL inputs each control 1 valve	One TTL input per valve, or demultiplex and control up to 16 valves with 4 inputs
PROGRAMMABLE	Yes- ValveBank keypad, EasyCode software or digital outputs from your data acquisition software	Only using real-time analog or digital outputs from your computer / data acquisition software.
SOFTWARE	Mac and PC "EasyCode" software to pre-program ValveBanks (up to 16 ch.)	Free Windows XP real-time USB control and networking software for up to 64 valves at once
MANUAL CONTROL	External keypad	Front panel buttons
MANUAL FEATURES	1-on, master channel, timed open, TTL outputs	1-on, master channel
SPEED	10 milliseconds	1 millisecond
VALVE POWER	4 watts per channel or 8 watts total	Up to 12 watts (1 amp) per channel, 24 watts (2 amps) total
PRICE	Higher	Lower

ValveLink8.2 Controller Ordering Information

Part No.	Product Description
01-18	**ValveLink®8.2 digital/manual controller**
01-26	**ValveLink®16.2 digital/manual controller**
01-19	**BNC cable** - ValveLink8.2 to pCLAMP/Digidata, et al., 4 BNC plugs to DB-9
01-27	**BNC cable** - ValveLink16.2 to pCLAMP/Digidata, et al., 5 BNC plugs to DB-15
01-29	**USB cable** - USB-A male, USB-B male 10' cable
01-30	**USB hub** - 4 port unpowered
01-17	**Rack-mounting brackets** - ValveLink8.2 to standard 19" rack
01-25	**Rack-mounting brackets** - ValveLink16 to standard 19" rack
	Cables for Heka/InstruTECH and LabView

U.S./Canada prices shown. International prices add 15%. Email or visit web store for latest prices.

Behind every great perfusion system is a reliable valve controller.

"We use the ValveBank in electrophysiology on a Xenopus oocyte recording rig. We have run a twelve-channel manual perfusion delivery system for several years with timed solenoid valves. The ValveBank and accompanying EasyCode Macintosh software allow us to program full wash and delivery sequences in advance with significantly more accurate switching. The new manual perfusion timing option allowed the ValveBank to perform exactly like the controller we had built before. Basically, the ValveBank saves us the worries of monitoring reagent-delivery, and it works."

Dr. David Julius
Department of Cellular and Molecular Pharmacology
University of California, San Francisco

ValveBank® Controller

- **Run experiments automatically – even unattended**
  By running experiments automatically, AutoMate Scientific systems will leave you free to accomplish other tasks – saving you both time and money.

- **Microprocessor-based for accuracy and flexibility**
  The ValveBank® can store sixteen user programs with 10 millisecond switching accuracy. It includes powerful perfusion commands and capabilities not offered by competing valve drivers: open single or multiple valves, master channel for control/buffer solution, and computer control.

- **Low noise & low voltage valve control**
  Designed for electrophysiology. CE marked for Europe.

- **Manual, TTL (digital), and serial (RS-232) inputs**
  Control valves manually (by keypad) or by computer – simultaneously thanks to the microprocessor design.

- **Low cost & low profile, simple design**
  Optional BNC cables and 19" rack-mounting brackets.

ValveBank4 & 8

- Dimensions: 10" x 7.5" x 2"
  Weight: 5 lbs. (2.27 kg.)

- User-selectable for normally open or closed valves
- 1.5 amp, 12V AC power supply included

- Back-lit LCD display
- Detached 16-key membrane keypad
- Easy menu-driven interface
- 16 or 32 user programs of 256 commands up to 99 hours long

EasyCode Software

- Program up to sixteen channels of valves and digital outputs.
- Open multiple experiment windows. List sequences to screen or printer. Copy and paste. Zoom in and out of your experiment.

Please see page 16.

All AutoMate Scientific valve controllers switch 12V DC solenoid valves open and closed rapidly using full power, then hold-in at 1/2 power to prevent thermal transfer to your solutions. Low noise circuitry minimizes recording artifacts in electrophysiology. ValveBanks are designed for use with pClamp, Pulse, et al. All AutoMate Scientific products include a one-year warranty.

The ValveBank® remains the only programmable valve controller for physiology that does not require a computer. ValveBanks include digital and manual control, plus programming through their keypad and LCD screen or EasyCode® software from a Macintosh or PC. ValveBanks run user valve sequences without a computer and include eight programmable digital outputs for control of external devices such as stimulators, pumps and recording devices. Entire ValveBank programs can even be triggered by a single TTL pulse.

EasyCode® - Expand the computing power of your ValveBank

Optional EasyCode software helps you program your ValveBank with a Mac or PC-Windows using easy "click-and-drag" time bars. Download your valve sequences into the ValveBank's memory with the included cable. Run programs on the ValveBank, which can be disconnected from the computer.

ValveBank or ValveLink8.2: Which controller is right for you?

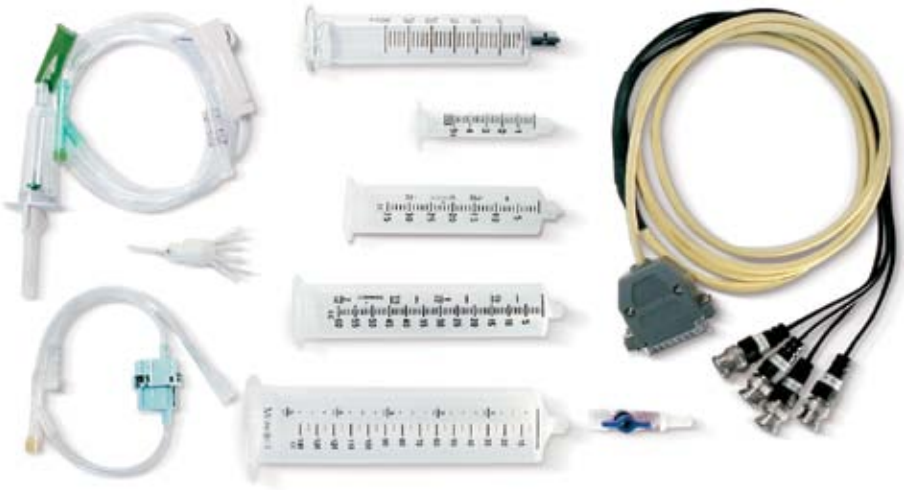
Features	ValveBank	ValveLink8.2
CHANNELS	4 or 8 channels available	8 channels each, USB network to 64 channels
COMPUTER I/O	8 digital in, 8 digital out, serial (RS-232)	8 digital in, USB, analog input, event marker out
DIGITAL INPUTS	One pulse can start a ValveBank program, or TTL inputs each control 1 valve	One TTL input per valve, or demultiplex and control up to 16 valves with 4 inputs
PROGRAMMABLE	Yes- ValveBank keypad, EasyCode software or digital outputs from your data acquisition software	Only using real-time analog or digital outputs from your computer / data acquisition software.
SOFTWARE	Mac and PC "EasyCode" software to pre-program ValveBanks (up to 16 ch.)	Free Windows XP real-time USB control and networking software for up to 64 valves at once
MANUAL CONTROL	External keypad	Front panel buttons
MANUAL FEATURES	1-on, master channel, timed open, TTL outputs	1-on, master channel
SPEED	10 milliseconds	1 millisecond
VALVE POWER	4 watts per channel or 8 watts total	Up to 12 watts (1 amp) per channel, 24 watts (2 amps) total
PRICE	Higher	Lower

ValveBank Controller Ordering Information

Part No.	Product Description
01-01	**ValveBank®4 programmable controller**
01-08	**ValveBank®8 programmable controller**
01-09	**BNC cable** - ValveBank to pCLAMP/Digidata, et al., 4 BNC plugs to DB-25
01-07	**Rack-mounting brackets** - ValveBank to standard 19" rack
01-06	**ValveBank keypad 6' extension cable**
	Cables for Heka/InstruTECH and LabView

U.S./Canada prices shown. International prices add 15%. Email or visit web store for latest prices.

Save time by purchasing disposable perfusion accessories from one source.



Perfusion Accessories

Syringe reservoirs

Replacement syringes and reservoirs are available for all perfusion systems. Luer lock 5, 15, 35, 60 and 140 ml plastic syringe reservoirs are standard. 35 ml glass syringes and Teflon tubing are available with our "Volatiles Pressure Upgrade" for researchers with volatile agents in solution. 800 ml beakers with luer lock fittings are available as replacements for the In Vivo Perfusion System.

Pressurized reservoirs

Custom, closed, pressurized Nalgene HDPE reservoir bottles are available in 1, 2, and 10 liter sizes with ringstand holders. Why keep refilling buffer all day? These require an AutoMate Scientific Pressurized Perfusion System or regulated pressure source.

Micro-manifolds and stoppers

4-, 8-, and 16-into-1 Teflon™ micro-manifolds for bath perfusion combine multiple tubes (1/16" (1.6 mm) i.d. or o.d.) into a single outflow tube. The manifolds include a built-in flow adjustment screw to decrease flow rate without adding dead volume. The 1/4 inch (6.35 mm) outflow is interchangeable with manifolds from Warner Instruments and all AutoMate Scientific perfusion chambers. Teflon™ Stoppers are available to temporarily close unneeded holes.

Hospital I.V. perfusion accessories

Disposable hospital I.V. drippers (drip chambers) get flow started in empty tubes and help visualize flow rates. Flow regulators restrict perfusion flow rates like the adjustment screw in our micro-manifolds. They are helpful in matching perfusion inflow rate to outflow rate. Both use 1/8" i.d. tubing. Case pricing available.

Perfusion reservoir gas bubbler

Available with or without an oxygen-safe regulator, the Perfusion reservoir gas bubbler is used to split a gas bottle like oxygen, carbogen, or CO_2 into multiple perfusion reservoirs. The included high-quality stones create a stream of fine bubbles to evenly saturate your solutions with gas. Each gas line can be individually adjusted. Replacement stones also available.

Tubing

Tygon, Teflon™, Silicone pinch valve, and Polyethylene tubing available in any length over 10 feet (3 meters).

Vacuum pump and trap

For labs without an easy vacuum source we offer a quiet Lab-duty oil-free vacuum pump with muffler for both 110V and 220V mains. Our large 10 liter polypropylene Vacuum Trap means you won't have to empty it as often. This Nalgene bottle includes easy luer lock fittings for vacuum tube connections and all necessary tubing to the pump and chamber.

Perfusion Accessories and Tubing Ordering Information

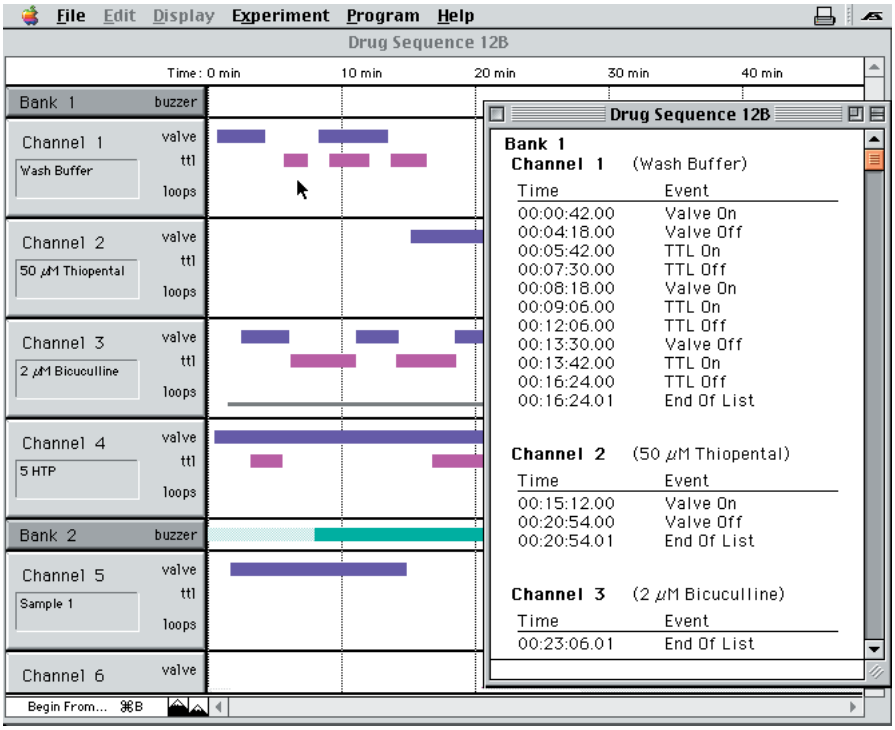
Part No.	Product Description
06-05c	**Case of 50x 5 ml syringes**
06-15c	**Case of 80x 15 ml syringes**
06-30c	**Case of 30x 35 ml syringes**
06-60c	**Case of 20x 60 ml syringes**
06-140c	**Case of 20x 140 ml syringes**
06-1Kp	**Pressurized 1 Liter reservoir** with bracket, fittings & tube (requires pressure)
06-2Kp	**Pressurized 2 Liter reservoir** with bracket, fittings & tube (requires pressure)
06-10Kp	**Pressurized 10 Liter reservoir** with fittings & tube (requires pressure)
05-04	**Micro-manifold, 4-into-1 Teflon** with flow control
05-08	**Micro-manifold, 8-into-1 Teflon** with flow control
05-16	**Micro-manifold, 16-into-1 Teflon** with flow control
05-05	**Micro-manifold stoppers** (set of four)
06-21	**Disposable flow regulator**
06-21c	**Case of 48x disposable flow regulators**
06-04	**Disposable drippers** (set of 4)
06-04c	**Case of 48x disposable drippers**
01-34	**Regulated perfusion reservoir gas bubbler** - 4 channel
01-35	**Un-regulated perfusion reservoir gas bubbler** - 4 channel
01-36	**Regulated perfusion reservoir gas bubbler** - 8 channel
01-39	**Un-regulated perfusion reservoir gas bubbler** - 8 channel
01-40	**Bubbler stones** - set of 4
05-11	**Tygon vinyl tubing** - 1/16" i.d.
05-13	**Teflon tubing** - 1/16" o.d. for use with nut & ferrule fittings
05-14	**Silicon pinch valve tubing** - 1/32" i.d. x 1/16" o.d.
04-09	**10 Liter vacuum trap** with lure-lock connections and tubing
canister	**2 Liter Perfusion vacuum trap** with tubing
vac	**Lab-duty oil-free vacuum pump (115 VAC)**
05-20	**Deluxe Luer Kit -** Polypropylene, approx. 25 items x 10 pcs.
05-21	**Deluxe Fitting Kit -** Polypropylene, approx. 45 items x 10 pcs.

U.S./Canada prices shown. International prices add 15%. Email or visit web store for latest prices.
First set of disposables included in perfusion systems. Please order a minimum of 10' of tubing.

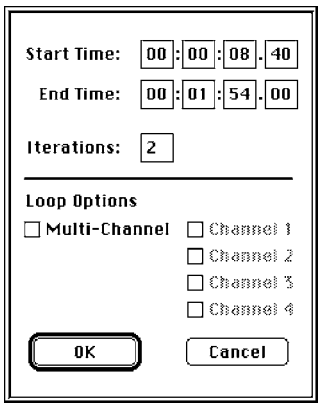
"The EasyCode software you provided is simple to use. We use a large screen Macintosh for creating and storing protocols. We especially like the ability to create new protocols and download them directly to the ValveBank, it really couldn't be easier."

Dr. Susan Abrahamson
University of California, Berkeley

Expand the computing power of your ValveBank system.



EasyCode Dialog Box



- Enter start and stop times accurate to 0.01 sec.
- Use all ValveBank commands including multi-channel looping and interface triggering

Free your computer during experiments

Transfer and run programs stored in the ValveBank, which can be disconnected from the computer – leaving it available for data acquisition.

EasyCode® Software

Program your ValveBank® with a Macintosh or PC using easy "click-and-drag" time bars. Save and load unlimited programs to disk, print out program listings, then download your sequences into the ValveBank's memory with the included serial cable in one simple step.

- **Program up to sixteen channels of valves and digital outputs**
  Open multiple experiment windows. List sequences to screen or printer. Copy and paste. Zoom in and out of your experiment.

EasyCode Software Ordering Information

Part No.	Product Description
01-02-USB	**EasyCode® Mac** - ValveBank programming software Macintosh OS 6-9 & Classic with USB-to-serial adapter
01-03	**EasyCode® PC** - ValveBank programming software - Windows 3.1-95
01-03-2000	**EasyCode® PC** - ValveBank programming software - Windows 98-XP
USB	**USB to serial converter** - PC or Macintosh

U.S./Canada prices shown. International prices add 15%. Email or visit web store for latest prices.

Precise control for whole-cell or single-cell superfusion.

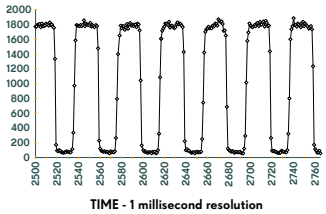
Pressurized Superfusion

For anyone who needs:

- **Faster switching and steady flow**
- **Fine microliter perfusion and microinjecting**

Easy to add to any new or existing gravity perfusion system from AutoMate Scientific, any third-party manufacturer, or even homemade rigs. Connect to house air or compressor (30 to 100 psi). Does not introduce bubbles into solution; helps overcome flow problems due to bubbles. Available in four-, eight- or sixteen-channel configurations. Syringe reservoirs may be placed in a water bath for temperature control. Elegant design allows individual control of each air line.

Liquid Switching in 3-4 msec.



Fast Flow Rhodamine B Fluorescence Switching - 40 ms period using the AutoMate Scientific Pressurized Perfusion System at 2 psi

Thilo Lacoste
Materials Science Division
Lawrence Berkeley National Laboratory

Precision Components

- 5 micron filter and gauge
- Precision regulator delivers 0-10 psi

Several sizes of plastic syringe reservoirs or 35 ml glass syringes and Teflon tubing as our "Volatiles Pressure Upgrade."

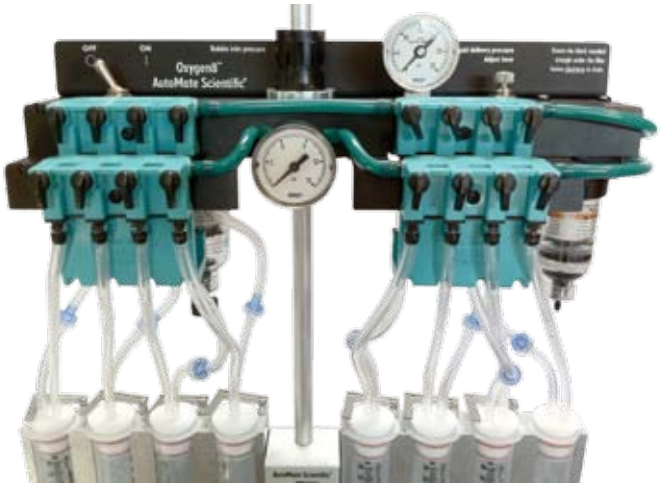
Rubber Stoppers

Pressure Upgrade available with 35 or 60 ml syringes and rubber stoppers shown in this photo, or 50 ml screw-cap reservoirs.

Precision Components

- Stainless steel construction
- 5 micron filter and gauge
- Precision regulator delivers 0-15 psi
- Convenient toggle switch completely closes gas connection to tank when not in use

New item!



Oxygen8™ Bubbled Pressure Kit

You need rapid liquid switching with oxygenated solutions. How do you bubble Carbogen gas into closed, pressurized reservoirs? That's the engineering problem AutoMate Scientific has solved with several years of research: bubbled, pressurized perfusion.

You can add the new Oxygen8 to any new or existing gravity perfusion system from AutoMate Scientific, any third-party manufacturer, or even homemade rigs. Connect to your desired gas (30 to 100 psi). Available in four- or eight-channel configurations. Syringe reservoirs may be placed in a water bath for temperature control or combine with the AutoMate BubbleStop™ syringe heater.

Pressurized Superfusion Ordering Information

Part No.	Product Description
09-04	**Perfusion Pressure Upgrade** - 4 channel
09-08	**Perfusion Pressure Upgrade** - 8 channel
09-16	**Perfusion Pressure Upgrade** - 16 channel
	with 35 or 60 ml plastic syringes, filter, regulator, and manifolds
09-04n	**Perfusion Pressure Upgrade** - 4x 50 ml screw-cap reservoirs
09-08n	**Perfusion Pressure Upgrade** - 8x 50 ml screw-cap reservoirs
09-16n	**Perfusion Pressure Upgrade** - 16x 50 ml screw-cap reservoirs
06-50	**Replacement 50ml screw-cap reservoir**
	with 50ml plastic screw-cap reservoirs, filter, regulator, and manifolds
09-04v	**Volatiles Pressure Upgrade** - 4 channel
09-08v	**Volatiles Pressure Upgrade** - 8 channel
09-16v	**Volatiles Pressure Upgrade** - 16 channel
	with 35 ml glass syringes, Teflon tube, filter, regulator and manifolds
06-30g	**Glass 30cc Syringes** - set of four
09-14	**Oxygen8™ Bubbled Pressure** - 4 channel
09-18	**Oxygen8™ Bubbled Pressure** - 8 channel
	with 35 or 60 ml plastic syringes, filter, regulator, and manifolds

U.S./Canada prices shown. International prices add 15%. Email or visit web store for latest prices.

Liquid switching times in milliseconds without moving sewer pipes.

Perfusion Pencil® Multi-Barrel Manifold Tip

- **Rapid solution change with micro-liter dead volume**
  No piezo or stepper motor translation. No clumsy rotating valves.
- **Single-cell and patch delivery**
  For mounting on any micromanipulator. Easy to connect and clean.
- **Vacuum cross-contamination prevention**
  Use one tube to vacuum the tip volume clear between solution changes.

Perfusion Pencil® Ordering Information

Part No.	Product Description
04-04-[x]	**Multi-barrel Perfusion Pencil®** - 4-into-1 with 100, 250 or 360 µm i.d. tip
04-08-[x]	**Multi-barrel Perfusion Pencil®** - 8-into-1 with tip
04-16-[x]	**Multi-barrel Perfusion Pencil®** - 16-into-1 with tip
04-[x]	**Replacement removable tips**
	[x] = specify -100, -250, or -360 µm i.d. removable tip or **[ZDV]** for new Zero Dead Volume Pencil (see ThermoClamp page)

U.S./Canada prices shown. International prices add 15%. Email or visit web store for latest prices.

Pencil Tip Cross Section

4 to 16 micro-bore tubes into 1 outflow

360 Micron Removable Tip

Flow rates (±0.05):

Gravity	1.15 ml/min
2 psi	3.98 ml/min
8 psi	10.66 ml/min

250 Micron Removable Tip

Flow rates (±0.05):

Gravity	.35 ml/min
2 psi	1.66 ml/min
8 psi	5.16 ml/min

100 Micron Removable Tip

Flow rates:

Gravity	zero flow
2 psi	0.07 ml/min
8 psi	0.25 ml/min

100, 250 and 360 micron internal diameter removable delivery tips available

All tubing now Teflon lined

Accurate temperature control, rapid solution switching and fast wash-out.

Heated Perfusion Pencil with Neoprene Sleeve Removed

Easy luer-lock connections and manipulator mounting. Thermodynamic design maintains temperature with 5 ml/minute flow from both tips without any metal tubing.

Temperature Sensors Included

Separate chamber bath and Perfusion Pencil thermocouples included.

See previous page for flow rates.

See next section for syringe warmer to minimize bubbles.

ThermoClamp™-1 Temperature Control System

- **Combination inline heater plus multi-channel focal drug delivery**
  Maintain bath temperature and rapid drug wash-out with a high-flow bath line while quickly switching 4-8 preheated solutions through the Perfusion Pencil.® Steady 37°C at 5 ml/minute flow rates through both the bath line and tip.

- **Advanced auto-tuning temperature lock**
  Fuzzy logic PID software maintains chamber or reagent temperature to within 1°C of setpoint or better. The ThermoClamp calibrates its own tuning for ideal temperature control - no need to guess "loop speed" settings.

- **Designed for physiology research**
  No metal anywhere in the flow path - unlike some competitors. Low noise for electrophysiology with internal and external grounding plus electrical isolation between liquids and heating elements.

- **Ready to use**
  Includes everything you need for heated perfusion: power supply, temperature sensors, and inline heater with easy luer lock tube connections.

You can have rapid switching, fast wash-out, and accurate temperature control at the same time. Set the ThermoClamp temperature from ambient to 50°C. A front-panel BNC provides an analog output of current temperature for recording. Different sizes of replaceable tips are interchangeable with our standard Perfusion Pencil. The tips have microliter dead volume for rapid switching. No messy water jacket is required, but the separate high-flow line is capable of heating a perfusion chamber with water jacket if desired.

Do you need to change your prep's temperature over the course of an experiment? A programmable "ramp and hold" feature can automatically vary the setpoint over time. The ThermoClamp system includes bath and Perfusion Pencil thermocouple sensors. Automatic overtemp and thermocouple failure protection alerts you to any problems. Incorporate temperature control into your perfusion rig with simple micromanipulator mounting.

Operation

Connect multiple reagent tubes from any perfusion system to the heated Perfusion Pencil on a manipulator directed into your chamber. If desired, connect a separate buffer line to the "high-flow" bath luer connection on the Pencil, and the outflow to your chamber. If your chamber includes a water jacket, you can use the high-flow line with a constant flow of water to heat the chamber. Place the bath thermocouple sensor in the chamber. Set your desired temperature on the controller and begin liquid flow. The ThermoClamp monitors bath temperature and heats the liquids flowing through the Perfusion Pencil keeping the chamber at exactly the desired temperature. Your perfusion system can quickly change solutions through the Perfusion Pencil tip and also deliver buffer for fast wash-out. Sophisticated circuitry will "auto tune" the ThermoClamp heating parameters based on your flow rates, chamber, and tubing to clamp the temperature and minimize over/undershoot.

ThermoClamp™ Temperature Control System Ordering Information

Part No.	Product Description
03-11-LL	**ThermoClamp™1** - 1 channel with controller, heated Pencil and sensors
03-14-[x]	**ThermoClamp™1** - 4 channel with controller, heated Pencil and sensors
03-18-[x]	**ThermoClamp™1** - 8 channel with controller, heated Pencil and sensors
	[x] = specify -100, -250, or -360 µm i.d. removable tip or **[ZDV]** for new Zero Dead Volume Pencil (see right column)
01-17b	**Rack-mounting brackets** - ThermoClamp to 19" rack
03-02	1 Channel replacement heated ThermoClamp Perfusion Pencil®
03-04	4 Channel replacement heated ThermoClamp Perfusion Pencil®
03-08	8 Channel replacement heated ThermoClamp Perfusion Pencil®

U.S./Canada prices shown. International prices add 15%. Email or visit web store for latest prices. Manipulator not included.

Easy to Read or Record

- Large LCD 0.1°C temperature display
- Analog temperature output

ThermoClamp-1

- Dimensions: 11.5" x 2" x 7"
- Weight: 4 lbs. (1.8 kg.)

Low noise - designed for electrophysiology.

CE

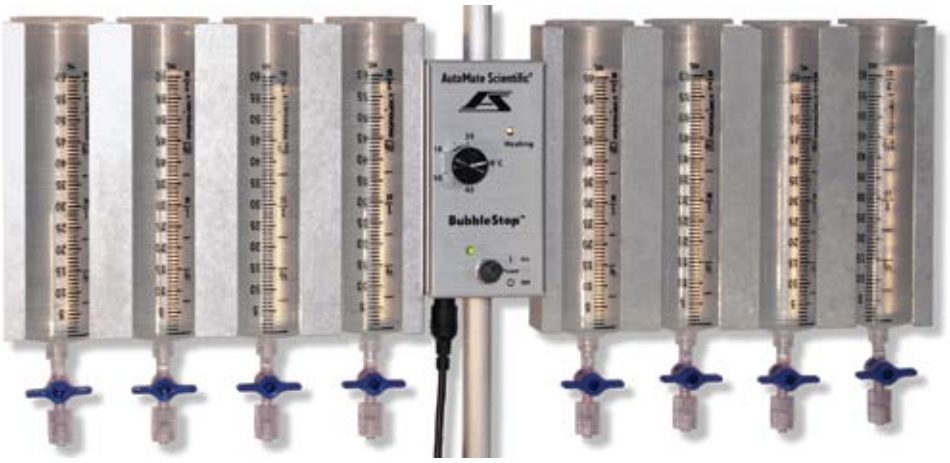
Zero Dead Volume Pencils

All AutoMate Scientific Perfusion Pencils (ThermoClamp, SmartSquirt and regular Perfusion Pencils) are now available in a "Zero Dead Volume" configuration with all internal tubes extended 2 cm out of the tip.

The "ZDV" Pencils do not use removable tips since all of the tubes go all the way to your prep.

This eliminates the possibility of backflow and decreases solution switching times down to nearly zero.

Stop bubbles by pre-warming solutions.



Available with gravity and pressurized syringes

Off-gassing with pressurized perfusion

Note: the BubbleStop is NOT sufficient to warm solutions for delivery into a perfusion chamber without an inline heater like our ThermoClamp. The BubbleStop only helps stop bubbles.

BubbleStop™ Syringe Heater

Bubbles in perfusion systems are caused by solution temperature changes. As solutions warm, they cannot hold as much gas, so they off-gas. This forms bubbles in perfusion tubing. It is especially true in inline heaters where the temperature rises dramatically. The best cure for bubbles is to pre-warm your solutions. AutoMate Scientific introduces the BubbleStop™ Syringe Heater with integrated temperature sensor and feedback. Set the temperature on the BubbleStop a few degrees higher than room temperature or your inline heater, and the warmed solutions will off-gas in the syringe reservoirs to the maximum gas concentration for that temperature. Even if they cool and re-heat again inside the perfusion tubing, they will not off-gas.

- Easy to remove full syringes
- Analog DC heating circuitry means low noise for electrophysiology
- Completely shielded electronics plus external power supply
- Spill-proof design
- Range: ambient to 50°C liquid temperature
- Mounts to standard 1/2" rod

BubbleStop™ Ordering Information

Part No.	Product Description
10-4-60-G	**BubbleStop4 60ml Syringe Heater - Gravity**
10-8-60-G	**BubbleStop8 60ml Syringe Heater - Gravity**
10-4-60-P	**BubbleStop4 60ml Syringe Heater - Pressurized**
10-8-60-P	**BubbleStop8 60ml Syringe Heater - Pressurized**
10-4-35-G	**BubbleStop4 35ml Syringe Heater - Gravity**
10-8-35-G	**BubbleStop8 35ml Syringe Heater - Gravity**
10-4-35-P	**BubbleStop4 35ml Syringe Heater - Pressurized**
10-8-35-P	**BubbleStop8 35ml Syringe Heater - Pressurized**
	Including 60ml or 35ml syringes, stopcocks and tubing. Pressurized version includes regulator, filter and gauge.

U.S./Canada prices shown. International prices add 15%. Email or visit web store for latest prices.

"I just wanted to tell you that I have been using the SmartSquirt nearly every day, and I am very pleased with it. I have tested for cross contamination, and I believe it is very low. To prevent hydrostatic flow from the cryostat tubes into the bath, one line must continue perfusing bath solution after all other valves are closed. Your design changes help hold all of the fittings tightly and keep them from leaking or flowing backwards. I would also rate your company as being excellent for your immediate response to problems and questions on your products."

Dr. John G. Starkus
The Queen's Medical Center
Honolulu, Hawaii

All tubing now Teflon lined

Perfuse microliter volumes of precious solutions.

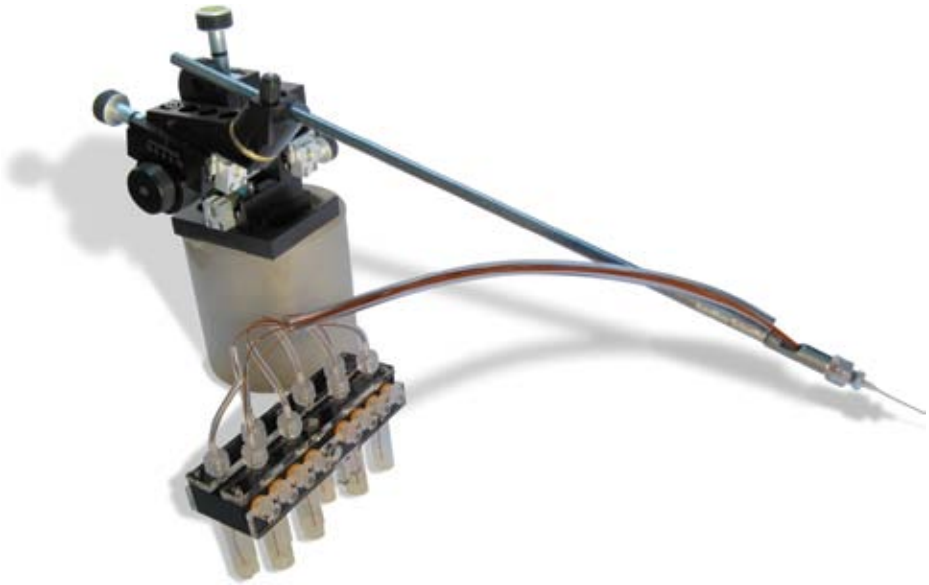
SmartSquirt® Micro-Perfusion System

- **Deliver microliter volumes starting with only 100 microliters of precious drugs**
  Switch between eight solutions in milliseconds from a single tip.
- **Minimize cross-contamination with BackStop™ back-flow prevention**
  Special 3-way relief valve design stops liquid flow quickly.
- **Valves and pressure controls in a small box near microscope - no stand necessary**
  Includes pressurized large-volume reservoir for buffer.

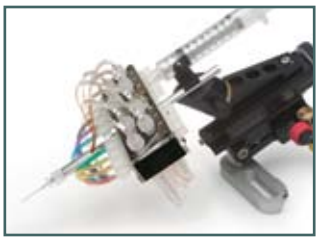
Programmable dispensing, microinjection, perfusion or spritzing of reproducible microliter volumes. Up to eight solutions are stored in cryo tubes with easy syringe refill ports. Included pneumatic valves deliver regulated air pressure to push liquids out of the SmartSquirt Perfusion Pencil tip. An AutoMate Scientific (or other) valve controller offers programmable, manual or computer-controlled valve selection for switching which reagent is delivered from the tip. Pulse a valve quickly for microliter delivery, or leave it on for constant perfusion. The short delivery path saves expensive reagents. Integrated BackStop™ check valves prevent backflow found in competing micro-perfusion systems.

Detached SmartSquirt now standard with longer Pencil

No room on your microscope stage for the SmartSquirt? The Perfusion Pencil for the SmartSquirt now uses longer tubes for mounting the Reservoir Block up to 30 cm away from the delivery location. The Pencil itself is also 30 cm long for easier mounting on wide stages. Both standard.



SmartSquirt Reservoir Block



- Uses standard 2.5 ml cryo-tubes as reservoirs
- Minimize cross-contamination with BackStop™ back-flow prevention: one-way check valves inside the reservoir block prevent liquid backflow from the tip
- Easy ports for refilling reservoirs
- Convenient manipulator mounting
- Luer lock tips are interchangeable with our standard Perfusion Pencil®

Integrated Pressure Regulator

Precision regulator, gauge, 5 micron filter and electric valves are built-in.

The 0-10 psi regulator and air filter require a compressed air or other gas source -- bottle, compressor or lab air.

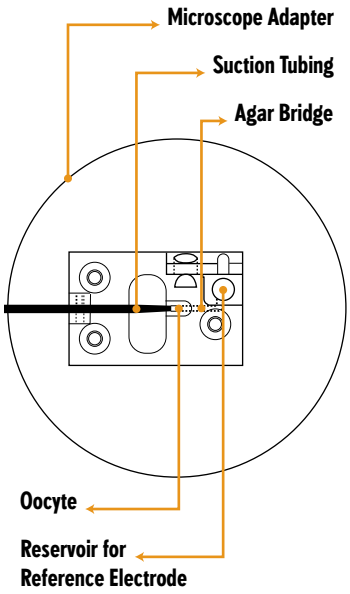
See page 19 for flow rates.

SmartSquirt® Micro-Perfusion System Ordering Information

Part No.	Product Description
07-04-[x]	**SmartSquirt®4 Micro-Perfusion System**
07-08-[x]	**SmartSquirt8 Micro-Perfusion System -** SmartSquirt Valve Pressure Unit, Reservoir Block & Perfusion Pencil
	SmartSquirt Systems with Valve Controllers
07-VL-04-[x]	**SmartSquirt4 ValveLink Micro-Perfusion System**
07-VL-08-[x]	**SmartSquirt8 ValveLink Micro-Perfusion System**
07-VB-04-[x]	**SmartSquirt4 ValveBank Micro-Perfusion System**
07-VB-08-[x]	**SmartSquirt8 ValveBank Micro-Perfusion System**
	[x] = specify -100, -250, or -360 µm i.d. removable tip or **[ZDV]** for new Zero Dead Volume Pencil (see ThermoClamp page)
06-25	**SmartSquirt Cryo vials - 2.5 ml** - Qty 8
06-25c	**SmartSquirt Cryo vials - 2.5 ml** - Bag of 100
02-01-05i	**Replacement SmartSquirt Valve**
05-07	**Colored SmartSquirt Tubing** - 1/16" i.d. (per foot)
07-04-c	**Replacement SmartSquirt Perfusion Pencil® -** 4 channels
07-08-c	**Replacement SmartSquirt Perfusion Pencil® -** 8 channels

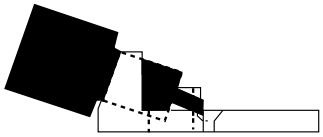
U.S./Canada prices shown. International prices add 15%. Email or visit web store for latest prices. Manipulator not included.

Oocyte Chamber Diagram



- Integrated outflow tube and agar bridge
- Chamber dimensions: 45 x 30 x 10 mm
- New slot for virtual ground electrode

Oocyte Chamber Side View



Insert micro-manifold for very low dead space

Low working volume means fast exchange times.

Oocyte Perfusion Chamber

- **Small working volume (< 20 µl)**
- **Fast solution exchange**

Expression of recombinant receptors in oocytes has been a favorite choice for researchers to assess the pharmacology of signal transduction pathways. Since the oocytes are 1 - 1.5 mm in diameter, however, fast solution exchange around the oocyte was difficult. After several years of electrophysiological research, we have designed a Xenopus oocyte perfusion chamber for use in automated and unattended experiments. Combined with an automated perfusion system, this chamber allows researchers to obtain dose-response data quickly and easily.

Oocyte Perfusion Chamber Ordering Information

Part No.	Product Description
OPC-1	**Oocyte perfusion chamber -** specify 80, 90, 100, 108, 110 or 120 mm stage adapter (Micro-manifold also recommended)

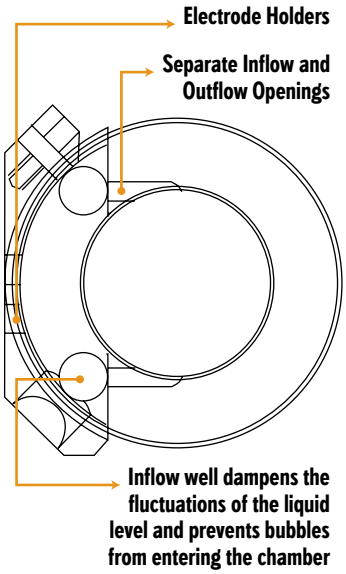
U.S./Canada prices shown. International prices add 15%. Email or visit web store for latest prices.

Why transfer to coverslips?

"We do, indeed, get a rapid change of solution (depending, of course, on the adjusted fluid level), with mechanical stability otherwise very good, and no problems with noise, and the system is otherwise rather easy to set up. I could confidently recommend it to any investigator who works with cells that adhere strongly to the substrate."

Dr. Jonathan E. Freedman, Ph.D.
Department of
Pharmaceutical Sciences
Northeastern University

Petri Chamber Diagram


Electrode Holders
Separate Inflow and Outflow Openings
Inflow well dampens the fluctuations of the liquid level and prevents bubbles from entering the chamber

Petri Dish Perfusion Chamber

- **Perfuse cells right in your Petri dish**
  Cells cultured in Petri dishes are a popular research tool used in applications from patch clamping to intracellular ion probe imaging. True perfusion (continuous inflow and outflow) of solutions in the dish can be difficult to configure. This forces scientists to plate cells on cover slips for placement into specially designed perfusion chambers. The PCP-1 chamber was designed by scientists after years of patch clamp research to overcome this problem. Perfuse cells right in your Petri dish with any perfusion system and an optional Teflon manifold (sold separately). Ideal for inverted microscopy using optically clear Petri dishes. Adjustable metal suction tube included.
  Dimensions: 35 mm outside dia. x 20 mm tall.

Petri Dish Perfusion Chamber Ordering Information

Part No.	Product Description
PCP-1	**Petri dish perfusion chamber insert** - optional specify Corning, Falcon, Nunc (Micro-manifold also recommended)

U.S./Canada prices shown. International prices add 15%. Email or visit web store for latest prices.

"I can perfuse up to five animals an hour, plus it costs no more than a tube of enzyme."

Dr. Yien Ming Kuo
University of California,
San Francisco

Mouse Brain Striatal Section

"Easy switch from saline to fixative–just turn the stopcock"

Dr. Sharon Smart
University of California,
San Francisco

2-way Manual Stopcock

Easy one-handed operation to switch solutions.

We've built a great fixation system so you don't have to.

In Vivo Manual Gravity Perfusion Systems

Rat 800 ml (91 cm tall) and mouse 140 ml (61 cm tall) systems shown

- **Consistent results**
  Steady gravity-fed delivery of buffer and fixative results in complete perfusion.

- **Easy to setup, use and clean**
  Complete system with everything down to the needles. Fits in standard hoods.

- **Fraction of the cost of a peristaltic pump and more reliable**

AutoMate Scientific is providing an option for the scientist who would rather do science than design a system, source parts, phone, buy, etc. Let us take the guesswork out of your new animal fixation system.

One or two users can perfuse two mice simultaneously with the Double In Vivo system. Four reservoirs and two stopcocks are mounted for two independent wash buffer and fixative deliveries on the same ringstand.

Rodent Fixation Systems Ordering Information

Part No.	Product Description
11-140	**In Vivo Perfusion System - 140 ml mouse**
11-04-140	**Double In Vivo Perfusion System - 4x 140 ml mouse**
11-20s	**In Vivo needle -** 20 ga x 1" sharp straight needle for mouse - Qty 4
11-20s-cs	**In Vivo needle -** 20 ga x 1" sharp straight needle for mouse - Box of 100
11-24bf	**In Vivo needle -** 25 ga x 3/4" sharp butterfly needle for mouse - Each
11-24bf-cs	**In Vivo needle -** 25 ga x 3/4" sharp butterfly needle for mouse - Box of 50
11-117	**Wax dissection tray -** Aluminum Tray for Mice - 11"x 7"
11-800	**In Vivo Perfusion System - 800 ml rat**
11-18s	**In Vivo needle -** 18 ga x 1" sharp straight needle for rat - Qty 4
11-18s-cs	**In Vivo needle -** 18 ga x 1" sharp straight needle for rat - Box of 100
11-20bf	**In Vivo needle -** 20 ga x 3/4" sharp butterfly needle for rat - Each
11-20bf-cs	**In Vivo needle -** 20 ga x 3/4" sharp butterfly needle for rat - Box of 50
11-139	**Wax dissection tray -** Aluminum Tray for Rats - 13"x 9"
09-01	**Swine cardiac pressurized perfusion system**

U.S./Canada prices shown. International prices add 15%. Email or visit web store for latest prices.

AutoMate Scientific®
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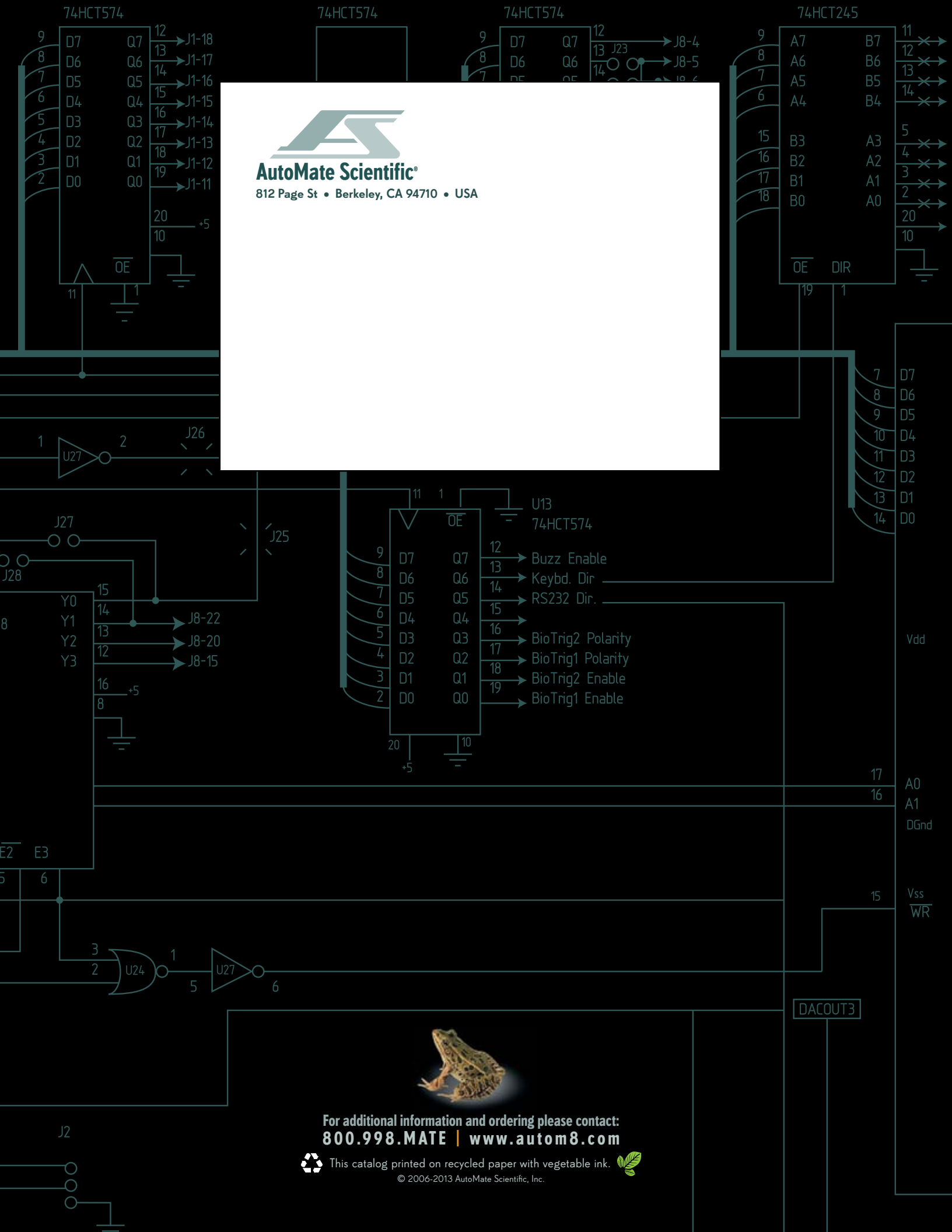

For additional information and ordering please contact:
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